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TORRES MARTINEZ
DESERT CAHUILLA

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November 19, 2002

To The Residents of the Torres Martinez Reservation:

Due to health concerns and risks, our requirements are to notify tribal members who consume water from the Public Water System whenever we discover a pollutant in the system.

In recent tests done by the Environmental Department at Torres Martinez, we have discovered that our well (Big Bertha) is showing levels of Ammonium Perchlorate. We have only conducted 1 test and regulations require that a second round of tests be conducted prior to any further action other than public notification.

The second rounds of tests were conducted today, November 19, 2002. The test results will not be available for 3 weeks. When the results are returned to the Environmental Department, we will notify all persons again as to the status of the water and host a public meeting for all interested parties.

For persons with low immune systems, nursing or pregnant mothers or low thyroid function, please contact the Environmental Office for further information at (760) 397-8145. Please ask to speak to Debi Livesay and she will be able to assist you with further needs.

For Trailer Park Owners: Please be advised that you should be testing your wells for the Same Constituents. We do not know how far the migration has developed and we feel it would be prudent to test and advise your residents as well.

Sincerely,

Torres Martinez Tribal Council
And
Torres Martinez Environmental Department

Cost Estimate
Perchlorate Remediation
By U.S. Filter

Biological System Installation
Owned by the Tribe
Back Wash once a day – with ethanol or other source
Discharges in sewer system – or septic tank in the mean time
Cost Estimate with peripheral costs at approximately $400,000.00
For just the one site based on the 60,000 gallons per day.

Well Head Treatment quick fix until tribal system installation

Resin Tank Possibility - Service Contract with U.S. Filter
$1,000.00 per day.
Could be installed within 1 month to 8 weeks or less

If we decide to do this, a study by U.S. Filter will have to examine system and make sure the numbers are correct. These numbers were meant as a rough estimate.

EPA
United States
Environmental Protection
Agency

Perchlorate Update

MARCH 2002

The United States Environmental Protection Agency (EPA) has released its revised draft toxicity assessment, "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization." When finalized, this assessment will be an important update of EPA's health assessment that reflects the state of the science regarding the health effects of the chemical perchlorate. The preliminary revised human health risk estimates found in the document are still undergoing review and deliberations both by the external scientific community and within EPA, and do not represent EPA policy at this stage.

How To Review and Comment on EPA's Draft Perchlorate Toxicity Assessment

The draft perchlorate toxicity assessment is available at EPA's National Center for Environmental Assessment (NCEA) Web site www.epa.gov/ncea under "what's new." Written public comments on the scientific literature and on EPA's characterization of the science in the draft perchlorate assessment will be accepted by EPA's contractor, Eastern Research Group, for consideration during the Agency's document revision process. These comments will be made available to the peer reviewers. Public comments must be received by April 5, 2002. Send your comments to: Eastern Research Group ERG, Attn: Meetings, 100 Hartwell Avenue, Lexington, MA 02421. If your comments are under 50 pages in length, you can send them via email attachment (in Word, WordPerfect or PDF) to *meetings@erg.com.*

What is Perchlorate?

Perchlorate is both a naturally occurring and man-made chemical. Most of the perchlorate manufactured in the United States is used as the primary ingredient of solid rocket propellant. Wastes from the manufacture and improper disposal of perchlorate-containing chemicals are increasingly being discovered in soil and water.

How Can Perchlorate Affect Human Health?

Perchlorate interferes with iodide uptake into the thyroid gland. Because iodide is an essential component of thyroid hormones, perchlorate disrupts how the thyroid functions. In adults, the thyroid helps to regulate metabolism. In children, the thyroid plays a major role in proper development in addition to metabolism. Impairment of thyroid function in expectant mothers may impact the fetus and newborn and result in effects including changes in behavior, delayed development and decreased learning capability. Changes in thyroid hormone levels may also result in thyroid gland tumors. EPA's draft analysis of perchlorate toxicity is that perchlorate's disruption of iodide uptake is the key event leading to changes in development or tumor formation.

What are the Preliminary Conclusions of the Draft Toxicity Assessment?

The EPA draft assessment concludes that the potential human health risks of perchlorate exposures include effects on the developing nervous system and thyroid tumors. The draft assessment includes a draft reference dose (RfD) that is intended to be protective for both types of effects. It is based on early events that could potentially result in these effects, and factors to account for sensitive populations, the nature of the effects, and data gaps were used. The draft RfD is 0.00003 milligrams per kilogram per day (mg/kg/day). The RfD is defined as an estimate, with uncertainty spanning perhaps an order of magnitude, of a daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of adverse effects over a lifetime. As with any EPA draft assessment document containing a quantitative risk value, that risk value is also draft and should not at that stage be construed to represent EPA policy. Thus, the draft RfD for perchlorate is still undergoing science review and deliberations both by the external scientific community and within the Agency.

The assessment provides a hypothetical conversion of the draft RfD to a drinking water equivalent level, assuming factors of 70 kilograms (kg) body weight and 2 liters (L) of water consumption per day. The converted draft estimate would be 1 microgram per liter (ug/L) or 1 part per billion (ppb). If the Agency were to make a determination to regulate perchlorate, the RfD, along with other considerations would factor into the final value.

Does Perchlorate Cause Cancer?

Perchlorate is associated with disruption of thyroid function which can potentially lead to thyroid tumor formation. This draft toxicity assessment accounts for both developmental and tumor formation effects.

Does My Water Contain Perchlorate?

Confirmed perchlorate releases have occurred in at least 20 states throughout the United States (see Figure 2). In EPA Region 9, perchlorate releases have occurred in California, Arizona, and Nevada. Perchlorate has also been released into the Colorado River, which is a drinking water source for some areas of the region. Additional information and maps detailing those sites are available in Chapter 1 of the draft of the "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization." EPA, other federal agencies, states, water suppliers and industry are already actively addressing perchlorate contamination through monitoring for perchlorate in drinking water and surface water. The full extent of perchlorate contamination is not known at this time.

What is Being Done about Perchlorate?

A peer review of the draft perchlorate toxicity assessment will be held March 5 and 6, 2002 in Sacramento, CA. The purpose of the peer review is to provide an independent review of the scientific information and interpretation used in the document. Once the assessment is finalized, the reference dose will be used in EPA's ongoing efforts to address perchlorate problems. EPA's draft reference dose represents a preliminary estimate of a protective health level and is not a drinking water standard. In the future, EPA may issue a Health Advisory that will provide information on protective levels for drinking water. This is one step in the process of developing a broader response to perchlorate including, for example, technical guidance, possible regulations and additional health information. A federal drinking water regulation for perchlorate, if ultimately developed, could take several years.

In 1998, perchlorate was placed on EPA's Contaminant Candidate List for consideration for possible regulation. In 1999, EPA required drinking water monitoring for perchlorate under the Unregulated Contaminant Monitoring Rule (UCMR). Under the UCMR, all large public water systems and a representative sample of small public water systems are required to monitor for perchlorate over the next two years to determine whether the public is exposed to perchlorate in drinking water nationwide.

How is Perchlorate Removed from Water?

Several types of treatment systems designed to reduce perchlorate concentrations are operating around the United States, reducing perchlorate to below the 4 ppb reporting level. Biological treatment and ion (anion) exchange systems are among the technologies that are being used, with additional treatment technologies under development.

Many other perchlorate studies have been completed during the last several years. A May 2001 summary of 65 perchlorate treatment studies is available online at www.gwrtac.org/ (click on "Technical Documents" then look for "Technology Status Reports"). The summary report was prepared by the Ground-Water Remediation Technologies Analysis Center. Most of the projects described in the report are bench-scale and pilot-scale demonstrations of water treatment technologies, although several entries describe full-scale systems and soil treatment methods. Most of the projects employ biological treatment methods or ion (anion) exchange technology, although reverse osmosis, nanofiltration, granular activated carbon, and chemical reduction are also discussed. Results of federally-funded perchlorate treatment research, managed by the American Water Works Association Research Foundation (AWWARF), are also becoming available (see www. awwarf. com/ research/spperch.asp).

Is Perchlorate-contaminated Water Safe to Drink?

EPA's draft toxicity assessment is preliminary and thus, it is difficult to make definitive recommendations at this stage. Other factors that influence the answer to this question include how much water is consumed, the degree of perchlorate contamination and the health status of the consumer.

Sensitive populations, like pregnant women, children and people who have health problems or compromised thyroid conditions, should follow the advice of their health care provider regarding the amount and type of liquids, including water that should be consumed.

Figure 1: U.S. Perchlorate Manufacturers and Users, as of October 2001

Figure 2: Reported Releases of Perchlorate into the Environment, as of November 2001

For more information

U.S. Environmental Protection Agency Contacts

Direct health and risk assesment questions to
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Office of Research and Development
(919) 541-4847

Direct questions about occurrence to
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Superfund Division
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Direct questions about treatment technology to.
Wayne Praskins
Region 9 Superfund Division
San Gabriel Valley treatment studies
(415) 972-3181

Direct questions about regulatory issues to
David Huber
Office of Ground Water and Drinking Water
(202) 564-4878

Direct questions about the Integrated Risk Information System (IRIS) to
Amy Mills
National Center for Environmental Assessment
Office of Research and Development
(202) 564-3204

During the peer review and in regard to Region 9
Direct press inquiries to:
Lisa Fasano
Region 9 Office of Public Affairs
(415) 947-4307

After peer review and outside of Region 9
Direct press inquiries to
Dave Deegan
EPA Office of Media Relations
(202) 564-7839

or

Richard David
Immediate Office of the Assistant Administrator
Office of Research and Development
(202) 564-3376

Direct questions about community involvement or the mailing list to
Wenona Wilson
Region 9 Community Involvement Coordinator
Superfund Division
(415) 972-3239
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Sincerely,

Torres Martinez Tribal Council
And
Torres Martinez Environmental Department

PERCHLORATE

Environmental Epidemiology and Toxicology Division **October 2002**

The Texas Department of Health (TDH) Division of Environmental Epidemiology and Toxicology has prepared this fact sheet to provide general information and answer some of the most frequently asked questions (FAQs) about perchlorate. For more information, call the Division of Environmental Epidemiology and Toxicology of TDH at (512) 458-7269.

HIGHLIGHTS: Exposure to high levels of perchlorate can effect the thyroid gland Women who are pregnant and their fetuses may be more susceptible since pregnancy itself stresses thyroid function To date, there has not been an organized survey of perchlorate occurrence in drinking water systems and therefore a regulation for perchlorate does not exist Some public water systems were required to monitor for perchlorate beginning in January 2001

What is Perchlorate?

Perchlorate is a compound made up of chlorine and oxygen that either can be found in nature or made by man It has been widely used in solid propellant fuels for rockets and missiles as well as in other products such as explosives, fireworks, road flares, air-bag inflation systems, lubricating oils, nuclear reactors, and electronic tubes Perchlorates also are used in tanning and leather finishing, electroplating, aluminum refining, rubber manufacture, and in paint and enamel production

What happens to perchlorate when it enters the environment?

- perchlorate salts that get into the air fall to the ground over time
- other perchlorates dissolve in water and can remain for decades under normal conditions

How might I be exposed to perchlorate?

- by drinking water that contains perchlorate
- by inhaling dust contaminated with perchlorate
- contact with water containing perchlorate is not expected to be a problem since perchlorates do not readily pass through the skin

How can perchlorates affect my health?

Perchlorate interferes with iodide uptake into the thyroid gland Because iodide is needed to make thyroid hormones, it may affect how the thyroid functions Adverse health effects associated with exposure to perchlorates are expected to be similar to those caused by iodine deficiency

In adults, the thyroid helps to regulate metabolism When thyroid function is affected, thyroid hormone production may decrease which can adversely affect the metabolic rate, causing thyroid stimulating hormone (TSH) to go up It may induce signs or symptoms of hypothyroidism, enlargements of the thyroid gland, and potentially increase the risk of thyroid tumors

Pregnancy puts an added stress on the thyroid gland Affecting thyroid function in expectant mothers may impact the fetus and newborn resulting in changes in behavior, delayed development, and decreased ability to learn Women with marginal iodine intake before and during pregnancy may develop clinical or subclinical hypothyroidism Under these conditions pregnant women are at increased risk for pregnancy complication such as preeclampsia (a potentially fatal condition), placental abruption (premature separation of the placenta possibly resulting in fetal death), and low birth weight infants Thus, exposure to perchlorate in drinking wate may be a greater concern for pregnant women and the developing fetus

Perchlorate Fact Sheet Internet address is www.tdh.state.tx.us/epitox

In children, the thyroid plays a major role in proper development. Infants and small children have less reserve of iodide in their thyroid glands than adults, putting them at a higher risk.

Infants who breast feed may be at greater risk. The sole source of iodide for the breast feeding infant is the mothers milk. Not only do these infants get perchlorate from the breast milk, they get less iodide from the mother because the perchlorate in the mother's system decreases the secretion of iodide into breast milk. Thus, the breast-feeding infant would be receiving an agent that competes with the uptake of iodide by the thyroid and at the same time would be in short supply of dietary iodide.

Is there a medical test to show whether I've bee exposed to perchlorate?

- perchlorate quickly leaves the body in the urir
- most labs can not test perchlorate in urine
- your doctor can do a blood test to determine i your thyroid gland is working properly

Has the federal government made recommendations to protect human health?

Currently, a National Primary Drinking Water Regulati for perchlorate does not exist. In March 1998, perchlorate was listed as a contaminant that required additional research and occurrence information before regulatory determinations could be considered. Beginning January 2001, all large public water systems and a representative sample of small public water systems were required to monitor for perchlorate.

Where can I get more information? For more information, contact the Texas Department of Health, Environmental Epidemiology and Toxicology Division, 1100 West 49th Street, Austin, Texas 78756. Phone 1-800-588-1248, FAX 512-458-7222.

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MAKING EVERY DROP COUNT SINCE 1918
COACHELLA VALLEY WATER DISTRICT
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Coachella Valley Aquifer Recharge Gets Underway

Colorado River water, which is a crucial component of efforts to recharge Coachella Valley's seriously overdrafted aquifer, began scheduled delivery today to percolation ponds via the Whitewater River.

About 340 acre-feet per day are expected to be delivered, with the "possibility" that delivery will continue through the year.

The water delivery was the first of the year associated with a unique, "bucket-for-bucket" accord between two local water agencies—Coachella Valley Water District (CVWD) and Desert Water Agency (DWA)—and Metropolitan Water District (MWD), the largest purveyor of water in Southern California, which along with the entire Southwest is in the midst of one of the most significant droughts in history.

Previously this year small amounts of water—totalling less than 500 acre-feet—have been purchased through the state and received for groundwater recharge, but this falls far short of the volume necessary to balance out the amount of water coming out of the ground with that that is going back in.

The valley averages only three inches of rainfall annually.

Through an agreement between CVWD and DWA with MWD, the local agencies exchange their annual entitlements (23,100 acre-feet and 38,100 acre-feet, respectively) to State Water Project (SWP) water for like amounts of Colorado River water from Metropolitan Water District.

In 2002, however, both CVWD and DWA were allotted only 45 percent of their entitlements at the start of the year, with the amount going up to about 75 percent since.

CVWD and DWA became participants in the SWP program in the early 1960s, but no facilities to deliver water from the California Aqueduct to the Coachella Valley exist. Instead, MWD adds the CVWD/DWA entitlements to SWP water to its own—which exceeds 2 million acre-feet—and delivers Colorado River water to Coachella Valley by releasing it from the Colorado River Aqueduct into Whitewater River.

From there water goes into recharge facilities at Windy Point, where it percolates into the ground, recharging the upper portion of the Coachella Valley's aquifer. CVWD is in the process of developing pilot recharge programs at two locations for the lower valley, where overdraft on the aquifer is the greatest and groundwater recharge more difficult because of an impervious layer of clay.

(more)

Under terms of the agreement, in wet years MWD delivers "advanced" amounts of water to CVWD/DWA, with the aquifer serving as a sort of water savings bank. In dry years, MWD is entitled to both the CVWD/DWA SWP water and Colorado River water, with no water going to CVWD and DWA.

Coachella Valley has benefitted greatly from this aspect of the program, and has "banked" nearly 225,000 acre-feet of water into the aquifer the area otherwise wouldn't have.

Groundwater recharge is a key component of the recently approved CVWD *Water Management Plan*, which outlines water usage in the Coachella Valley for the next 35 years. Through various conservation programs, the use of alternative sources of water—such as canal water to irrigate golf courses—and groundwater recharge, CVWD has developed a plan to limit future water demand to a 25-per.ent increase, even though the population is projected to increased by twice that—50 percent or more—by 2037.

Exchange agreement water was first delivered to Coachella Valley in 1973 and as much as 298,201 acre-feet of Colorado River water has been received in a single year, which in 1986 raised groundwater tables about 50 feet. Almost that much—251,994 acre-feet—was delivered in the previous year.

Twice—in 1977 because of drought and in 1978 because of flood damage to the spreading ponds—no water was delivered by MWD. In 1991, again because of drought, only 14 acre-feet was delivered.

An acre-foot is 325,851 gallons, enough water to cover a football field one foot deep in water.

Water delivered through existing agreements is not sufficient, however, to eliminate or significantly reduce aquifer overdraft.

Overdraft has potentially serious consequences that include permanently reduced groundwater storage capacity, diminished water quality and subsidence, a condition where with the absence of water the ground compresses and actually sinks, jeopardizing homes, businesses and infrastructure such as water lines.

Thus, for the upper valley an agreement is being worked out where as much as 100,000 additional acre-feet will be available from MWD in wet years.

This agreement is part of the more than 40 accords that represent parts of a complex puzzle known as the Quantification Settlement Agreement (QSA), cornerstone of efforts to reduce California's dependency on the Colorado River to 4.4 million acre-feet per year.

CVWD, Imperial Irrigation District (IID), MWD and San Diego County Water Authority (SDCWA) must ratify the QSA by December 31 or the Secretary of the Interior has indicated that the Interim Surplus Guidelines, which allow California to receive what has been as much as 5.3 million acre-feet, will be suspended immediately, eliminating California's access to as much as 800,000 acre-feet annually.

The biggest component of the QSA is the transfer of as much as 200,000 acre-feet from IID to SDCWA. Representatives of the four agencies, state and federal elected officials and staff, met for two

(more)

months and negotiated an agreement, known as the QSA Term Sheet. The boards of directors for CVWD, MWD and SDCWA have ratified the term sheet, but no water agency yet has ratified the actual QSA.

The QSA quantifies CVWD's annual entitlement to Colorado River water at 330,000 acre-feet, and also includes provisions that provide for the eventual transfer or more than 100,000 acre-feet annually from IID to CVWD, water that will be used through recharge and alternative uses to reduce aquifer overdraft in the lower valley. CVWD also obtains entitlement to 20,000 acre-feet from a previous transfer from IID to MWD, and will be able to purchase up to 35,000 additional acre-feet from MWD.

After allowing for reduced allotments created by lining remaining earthen portions of the Coachella Canal with concrete, under the QSA CVWD ends up with 456,000 acre-feet of Colorado River water annually.

A portion of this water will be used for crop irrigation farmers are encouraged to convert from well water to canal water, with canal water also planned for non-potable uses such as golf course and other landscape irrigation. Much of the water will be used for direct recharge programs.

CVWD's *Water Management Plan* calls for a 10-percent reduction in municipal water demand by 2010, a five percent reduction in existing golf course water demand by the same year and a seven percent reduction in crop irrigation water demand by 2015.

Master Response on Perchlorate

INTRODUCTION

The Draft Program Environmental Impact Report (PEIR) has identified the potential for increased perchlorate concentrations in groundwater wells as a potentially significant impact of the Proposed Project. Mitigation has been proposed to reduce this impact to less than significant by providing treatment for any drinking water supplies that exceed public health standards based on monitoring the quality of groundwater produced from drinking water wells located near the proposed groundwater recharge areas. Proposed mitigation includes working with the well owners to bring their drinking water supply into compliance by either providing domestic water service from the CVWD or DWA domestic water systems or by providing appropriate well-head treatment, if monitoring shows that the groundwater pumped from these wells exceeds any health-based drinking water standard due to recharge activities.

Perchlorate (ClO_4^-) is a contaminant from the solid salts of ammonium, potassium or sodium perchlorate. Ammonium perchlorate has been used as an oxygen-adding component in solid fuel propellant for rockets, missiles and fireworks. Perchlorate compounds are also used in air bag inflators, nuclear reactors, electronic tubes, lubricating oils, electronic plating, aluminum refining, leather tanning and finishing, rubber and fabric manufacture and in the production of paints, enamels and dyes. Perchlorate is highly mobile in water and can persist under typical groundwater and surface water conditions for decades. Perchlorate is known to interfere with the uptake of iodine by the thyroid gland. Because iodine is an essential component of thyroid hormones, perchlorate disrupts the function of the thyroid gland. Perchlorate is among the unregulated chemicals requiring monitoring (Title 22, California Code of Regulations §64450). It is "unregulated" because it has no drinking water standard or maximum contaminant level (MCL).

PERCHLORATE STANDARDS

Several commenters stated that Colorado River water contains "dangerous" levels of perchlorate and that any perchlorate in the recharge water was unacceptable. These conclusions are a function of the criteria used to determine the significance of the perchlorate concentrations in Colorado River water. Therefore some explanation of the development of perchlorate regulations is needed.

There are some misconceptions regarding the current health standards for perchlorate. First, there is no adopted enforceable standard for perchlorate in drinking water. The US Environmental Protection Agency's (EPA) National Center for Environmental Assessment (NCEA) issued a *draft* toxicity assessment for perchlorate that included a *draft* reference dose (RfD) of 0.00003 milligrams per kilogram per day (mg/kg/day). The RfD is defined as an estimate, with uncertainty spanning perhaps an order of magnitude (ten-fold), of a daily exposure to the human population (including sensitive subgroups such as pregnant women, children and people with compromised thyroid conditions) that is likely to be without appreciable risk of

adverse effects over a lifetime. EPA used a lowest observed adverse effects level (LOAEL) of 0.01 mg/kg/day as determined from animal studies. This LOAEL was divided by a composite uncertainty factor of 300 that accounts for 1) human sensitivity, 2) the duration of health studies and 3) database quality to compute the draft RfD of 0.00003 mg/kg/day.

The EPA assessment provided a hypothetical conversion of the draft RfD to a drinking water equivalent level (DWEL), assuming factors of 70 kilograms (kg) for body weight and 2 liters (L) of water consumption per day. The converted draft estimate would be 1 microgram per liter (µg/L) or 1 part per billion (ppb), assuming drinking water is the sole source of perchlorate. If EPA were to make a determination to regulate perchlorate, the RfD along with other considerations would factor into the final value. At this point in time, the EPA has not determined whether to regulate perchlorate in drinking water. If the EPA decides to regulate perchlorate, the RfD along with other health effects information, economic considerations, and technical feasibility would be used to establish a federal MCL. However, any federal standard would be established after California promulgates its own MCL. The Safe Drinking Water Act requires that any California drinking water standard must be at least as stringent as the federal MCL.

On its website, EPA states: "*As with any EPA draft assessment document containing a quantitative risk value, that risk value is also draft and should not at that stage be construed to represent EPA policy. Thus, the draft RfD for perchlorate is still undergoing science review and deliberations both by the external scientific community and within the Agency.* " (emphasis added). The draft RfD is not an adopted standard. Instead, it serves as a starting point for establishing a drinking water standard. The RfD is currently undergoing scientific peer review; a report by its peer review committee was released in June 2002. EPA is currently reviewing the peer review report and public comments. EPA expects to release a revised draft; however, no date has been given for its release. Given the on-going review, it is premature to ascribe a maximum perchlorate concentration based on the current draft risk assessment.

Similarly, the State of California Office of Environmental Health Hazard Assessment (OEHHA) issued a *draft* public health goal (PHG) for perchlorate of 6 µg/L. This PHG was based on results of human studies that established a "no observed adverse effects level" of 0.01 mg/kg/day and an uncertainty factor of 30. The PHG is calculated using a 65 kg body weight, 2 L/day water consumption and 60 percent of daily perchlorate exposure from drinking water. A public workshop on the PHG was held on April 29 and a revised draft should be available by late summer 2002. OEHHA expects to finalize the PHG by the end of 2002.

The California Department of Health Services (DHS) established a health-based action level for perchlorate of 18 µg/L in 1997. The California Health & Safety Code §116455 requires a drinking water system to notify the governing body of the local agency in which users of the drinking water reside (*i.e.*, city council and/or county board of supervisors) when a contaminant in excess of an action level or a MCL is discovered in drinking water well, or when the well is closed due to the contaminant's presence. DHS recommends that the drinking water system take the source out of service if a contaminant is present at more than 10 times the action level. In the case of perchlorate, this would currently be a concentration of 40 µg/L.

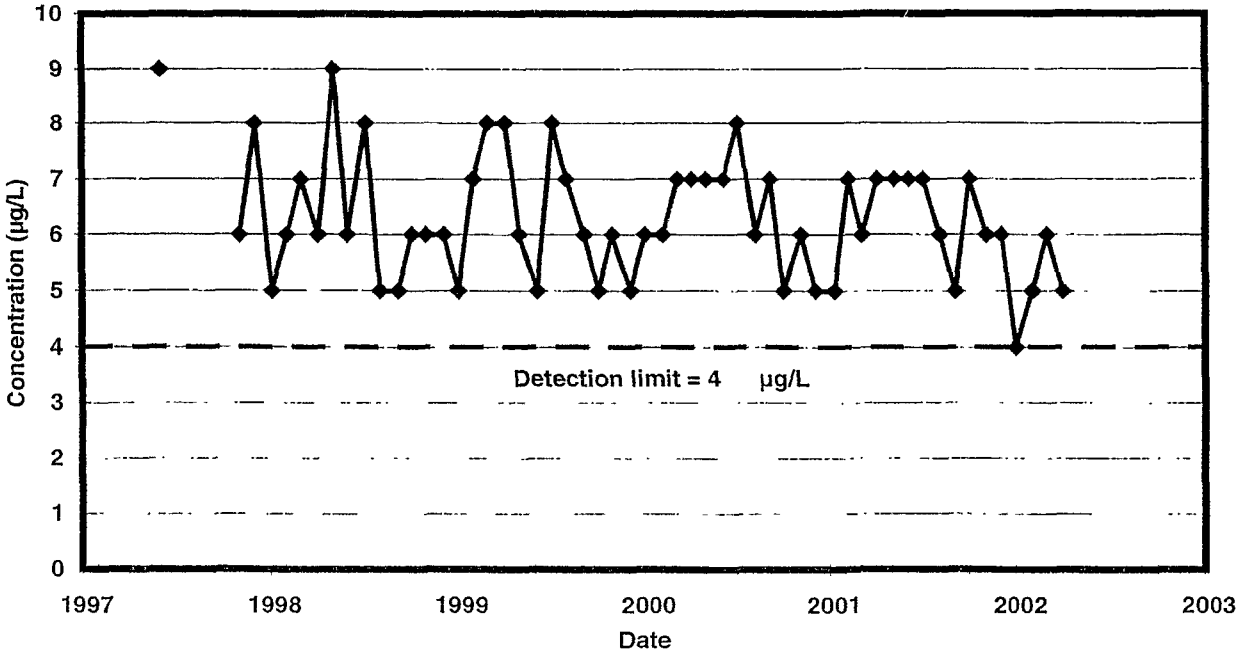
In January 2002, the EPA NCEA released a draft revised risk assessment for perchlorate which concluded that the health risks associated with perchlorate are greater than previously determined. As a result of the release of the draft NCEA health risk assessment, DHS lowered its action level for perchlorate from 18 µg/L to 4 µg/L, which is the detection limit (January 2002). Senate Bill 1822 (Sher), which calls for OEHHA to establish a PHG by January 1, 2003 and for DHS to adopt a primary drinking water standard by January 1, 2004 signed by the Governor on September 8, 2002..

In summary, it is premature to adopt a drinking water standard for perchlorate concentrations without considering the scientific evidence. Consequently, the current action level of 4 µg/L is used as a threshold for significance recognizing that the ultimate MCL could be higher than the action level.

SOURCE AND DISPOSITION OF PERCHLORATE

Perchlorate was initially detected by Metropolitan at a level of 9 µg/L at Lake Havasu (see **Figure 5-8** of the Draft PEIR and repeated below). Recent measurements at Lake Havasu have been in the range of 4 to 6 µg/L. In 2001 and 2002, IID detected perchlorate in the All-American Canal system ranging from 4.2 to 5.3 µg/L.

Figure 1
Perchlorate Concentrations in Colorado River Aqueduct Water



The source of perchlorate in Colorado River water has been determined to be the Kerr-McGee Chemical Company and the former PEPCON perchlorate manufacturing facilities in Henderson, Nevada. Perchlorate waste from decades of poor disposal practices has permeated into the groundwater under the manufacturing site which flows into Las Vegas Wash and then into Lake

Mead. Kerr-McGee, working with the Nevada Division of Environmental Protection (NDEP), constructed a slurry wall to slow the migration of the perchlorate plume to Las Vegas Wash, began extracting perchlorate-contaminated groundwater, and has operated an interim 450 gpm groundwater treatment system since 1999. Kerr-McGee began operation of a larger (825 gpm) treatment facility in late March 2002 (S. Crowley, Kerr-McGee, pers. comm. 2002) which is expected to significantly reduce the perchlorate entering Lake Mead (Metropolitan, 2002b).

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Ion exchange treatment prior to recharge in the Coachella Valley would require three facilities having the following capacities:

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1 Design capacity is based on recharging the average annual flow within a six month off-peak demand period.
2 Note that the average recharge at Whitewater would be 140,000 acre-ft/yr through 2007, decreasing to 103,000 acre-ft/yr by 2013.

The capital cost for ion exchange treatment facilities would be $260 million at the Whitewater facility and $74 million each for the Dike 4 and Martinez facilities, exclusive of brine disposal costs. The total capital cost for treatment would be $408 million. This high capital cost is dictated by the capacity of the treatment facilities, which are sized to recharge the desired amount of water within the six month off-peak period (October through March). Delivery of water for recharge during the peak demand months (April through September) is unlikely due to the need to serve direct users of Coachella Canal water and Metropolitan's need to meet demands in its service area with Colorado River water.

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	Whitewater Spreading Grounds	Dike 4	Martinez	Total
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Contingency	$45,000,000	$12,860,000	$12,860,000	$70,720,000
Construction Cost	$225,000,000	$64,290,000	$64,290,000	$353,580,000
Engg & Admin	$33,750,000	$9,650,000	$9,650,000	$53,050,000
Land	$140,000	$40,000	$40,000	$220,000
Capital Cost	**$258,890,000**	**$73,980,000**	**$73,980,000**	**$406,850,000**
Operating Cost				
Amortized Capital	$20,260,000	$5,790,000	$5,790,000	$31,840,000
Fixed O&M	$5,180,000	$1,480,000	$1,480,000	$8,140,000
Salt	$6,710,000	$1,920,000	$1,920,000	$10,550,000
Total	**$32,150,000**	**$9,190,000**	**$9,190,000**	**$50,530,000**
Annual Flow (acre-ft/yr)	**140,000**	**40,000**	**40,000**	**220,000**
Unit Cost ($/acre-ft)	**$230**	**$230**	**$230**	**$230**

The total annual cost for all three facilities would be $50.5 million per year. Of this amount, about $40.8 million would be borne by CVWD and $9.7 million by DWA. This expenditure would increase CVWD's annual domestic water operating costs by 110 percent compared to current annual expenditures. This would require domestic water rates to more than double compared to current rates.

As noted previously, these costs do not include brine disposal. Approximately 100 tons of salt per year would be required for regeneration. The brine would contain large amounts of perchlorate as well as nitrate and sulfate. It is expected there would be significant environmental issues associated with brine disposal including land use, biological and cultural resources, and water quality.

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Facilities for post-recharge treatment of extracted water could have smaller capacities, since only drinking water supply would require treatment if their perchlorate concentrations exceeded the future perchlorate MCL. Water pumped for golf course irrigation or other non-potable uses would not receive treatment because perchlorate is not an issue for these uses. There are

approximately 45 domestic water supply wells in the Upper Valley that could potentially be affected by water recharged at the Whitewater Spreading Facility based on data presented in the draft PEIR. These wells have an average capacity of about 2500 gpm (3.6 mgd, 162 mgd total). In addition, it is assumed that there are about 20 domestic wells in the Lower Valley that could be affected by recharge at the Dike 4 and Martinez Canyon sites with average capacities of about 500 gpm (0.7 mgd each, 14 mgd total). It is unlikely that all of these wells would experience elevated perchlorate concentrations due to dilution with native groundwater. Therefore, this estimate is extremely conservative.

If treatment were provided for all of these potentially affected wells, the total capital cost would be about $200 million and the total annual cost would be about $23 million, exclusive of brine disposal as shown in Table 3. Allocating the cost of treatment between DWA and CVWD based on their relative share of groundwater production results in about $6.3 million in additional cost for DWA and $16.4 million for CVWD. For CVWD, this cost represents a 50 percent increase in the current cost of domestic water.

Table 3
Groundwater Perchlorate Treatment Costs

	Whitewater Spreading Grounds	Dike 4	Martinez	Total
Capital Cost				
Ion Exchange	$116,640,000	$7,780,000	$2,600,000	$127,020,000
Contingency	$29,160,000	$1,950,000	$650,000	$31,760,000
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Amortized Capital	$13,130,000	$880,000	$300,000	$14,310,000
Fixed O&M	$3,360,000	$230,000	$80,000	$3,670,000
Salt	$4,350,000	$290,000	$100,000	$4,740,000
Total	**$20,840,000**	**$1,400,000**	**$480,000**	**$22,720,000**
Annual Flow (acre-ft/yr)	**90,720**	**6,048**	**2,016**	**98,784**
Unit Cost ($/acre-ft)	**$230**	**$231**	**$238**	**$230**

CONCLUSION

Given the uncertainty associated with the future drinking water standard for perchlorate, the current low concentrations in Colorado River water, the on-going clean-up activities in Las Vegas Wash, the expected reduction in future perchlorate concentrations, the high cost of

treatment and uncertainties associated with brine disposal, CVWD believes treatment for perchlorate prior to recharge is not economically feasible and may not be necessary due to the on-going source control efforts at Las Vegas Wash. The cost of pre-treatment would more than double the cost of domestic water. Wellhead treatment could increase domestic water costs for CVWD by about 50 percent.

Master Response on Perchlorate

INTRODUCTION

The Draft Program Environmental Impact Report (PEIR) has identified the potential for increased perchlorate concentrations in groundwater wells as a potentially significant impact of the Proposed Project. Mitigation has been proposed to reduce this impact to less than significant by providing treatment for any drinking water supplies that exceed public health standards based on monitoring the quality of groundwater produced from drinking water wells located near the proposed groundwater recharge areas. Proposed mitigation includes working with the well owners to bring their drinking water supply into compliance by either providing domestic water service from the CVWD or DWA domestic water systems or by providing appropriate well-head treatment, if monitoring shows that the groundwater pumped from these wells exceeds any health-based drinking water standard due to recharge activities.

Perchlorate (ClO_4^-) is a contaminant from the solid salts of ammonium, potassium or sodium perchlorate. Ammonium perchlorate has been used as an oxygen-adding component in solid fuel propellant for rockets, missiles and fireworks. Perchlorate compounds are also used in air bag inflators, nuclear reactors, electronic tubes, lubricating oils, electronic plating, aluminum refining, leather tanning and finishing, rubber and fabric manufacture and in the production of paints, enamels and dyes. Perchlorate is highly mobile in water and can persist under typical groundwater and surface water conditions for decades. Perchlorate is known to interfere with the uptake of iodine by the thyroid gland. Because iodine is an essential component of thyroid hormones, perchlorate disrupts the function of the thyroid gland. Perchlorate is among the unregulated chemicals requiring monitoring (Title 22, California Code of Regulations §64450). It is "unregulated" because it has no drinking water standard or maximum contaminant level (MCL).

PERCHLORATE STANDARDS

Several commenters stated that Colorado River water contains "dangerous" levels of perchlorate and that any perchlorate in the recharge water was unacceptable. These conclusions are a function of the criteria used to determine the significance of the perchlorate concentrations in Colorado River water. Therefore some explanation of the development of perchlorate regulations is needed.

There are some misconceptions regarding the current health standards for perchlorate. First, there is no adopted enforceable standard for perchlorate in drinking water. The US Environmental Protection Agency's (EPA) National Center for Environmental Assessment (NCEA) issued a *draft* toxicity assessment for perchlorate that included a *draft* reference dose (RfD) of 0.00003 milligrams per kilogram per day (mg/kg/day). The RfD is defined as an estimate, with uncertainty spanning perhaps an order of magnitude (ten-fold), of a daily exposure to the human population (including sensitive subgroups such as pregnant women, children and people with compromised thyroid conditions) that is likely to be without appreciable risk of

adverse effects over a lifetime. EPA used a lowest observed adverse effects level (LOAEL) of 0.01 mg/kg/day as determined from animal studies. This LOAEL was divided by a composite uncertainty factor of 300 that accounts for 1) human sensitivity, 2) the duration of health studies and 3) database quality to compute the draft RfD of 0.00003 mg/kg/day.

The EPA assessment provided a hypothetical conversion of the draft RfD to a drinking water equivalent level (DWEL), assuming factors of 70 kilograms (kg) for body weight and 2 liters (L) of water consumption per day. The converted draft estimate would be 1 microgram per liter (µg/L) or 1 part per billion (ppb), assuming drinking water is the sole source of perchlorate. If EPA were to make a determination to regulate perchlorate, the RfD along with other considerations would factor into the final value. At this point in time, the EPA has not determined whether to regulate perchlorate in drinking water. If the EPA decides to regulate perchlorate, the RfD along with other health effects information, economic considerations, and technical feasibility would be used to establish a federal MCL. However, any federal standard would be established after California promulgates its own MCL. The Safe Drinking Water Act requires that any California drinking water standard must be at least as stringent as the federal MCL.

On its website, EPA states: "*As with any EPA draft assessment document containing a quantitative risk value, that risk value is also draft and should not at that stage be construed to represent EPA policy. Thus, the draft RfD for perchlorate is still undergoing science review and deliberations both by the external scientific community and within the Agency.* " (emphasis added). The draft RfD is not an adopted standard. Instead, it serves as a starting point for establishing a drinking water standard. The RfD is currently undergoing scientific peer review; a report by its peer review committee was released in June 2002. EPA is currently reviewing the peer review report and public comments. EPA expects to release a revised draft; however, no date has been given for its release. Given the on-going review, it is premature to ascribe a maximum perchlorate concentration based on the current draft risk assessment.

Similarly, the State of California Office of Environmental Health Hazard Assessment (OEHHA) issued a *draft* public health goal (PHG) for perchlorate of 6 µg/L. This PHG was based on results of human studies that established a "no observed adverse effects level" of 0.01 mg/kg/day and an uncertainty factor of 30. The PHG is calculated using a 65 kg body weight, 2 L/day water consumption and 60 percent of daily perchlorate exposure from drinking water. A public workshop on the PHG was held on April 29 and a revised draft should be available by late summer 2002. OEHHA expects to finalize the PHG by the end of 2002.

The California Department of Health Services (DHS) established a health-based action level for perchlorate of 18 µg/L in 1997. The California Health & Safety Code §116455 requires a drinking water system to notify the governing body of the local agency in which users of the drinking water reside (*i.e.*, city council and/or county board of supervisors) when a contaminant in excess of an action level or a MCL is discovered in drinking water well, or when the well is closed due to the contaminant's presence. DHS recommends that the drinking water system take the source out of service if a contaminant is present at more than 10 times the action level. In the case of perchlorate, this would currently be a concentration of 40 µg/L.

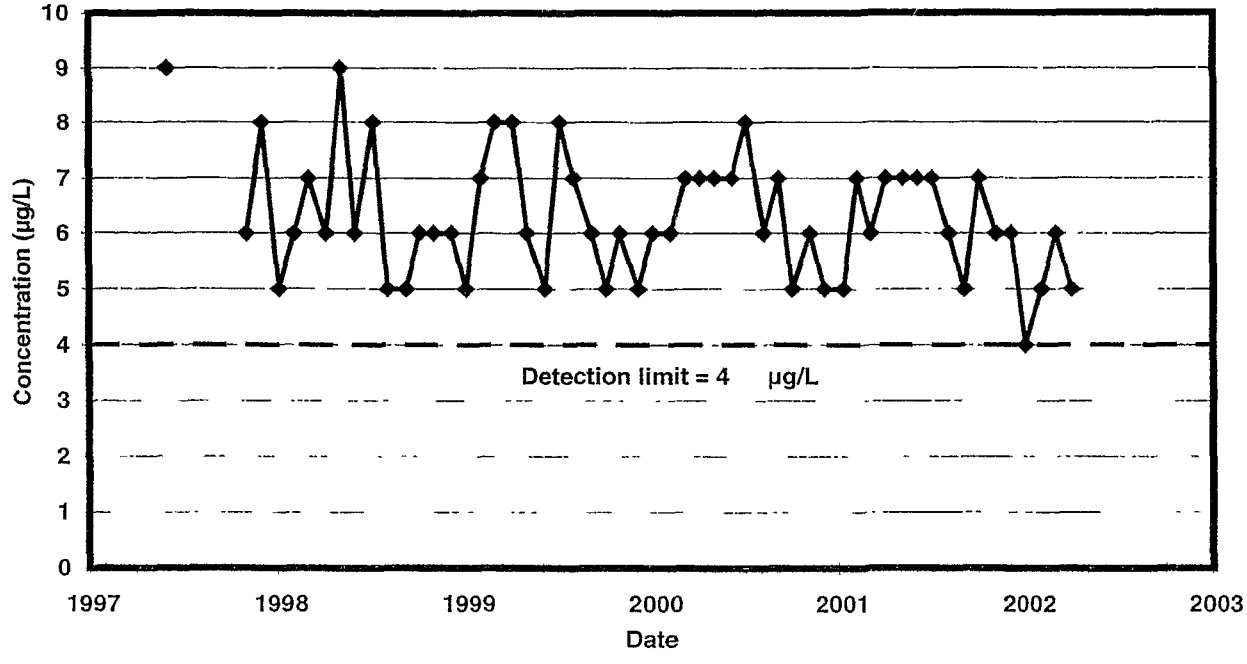
In January 2002, the EPA NCEA released a draft revised risk assessment for perchlorate which concluded that the health risks associated with perchlorate are greater than previously determined. As a result of the release of the draft NCEA health risk assessment, DHS lowered its action level for perchlorate from 18 µg/L to 4 µg/L, which is the detection limit (January 2002). Senate Bill 1822 (Sher), which calls for OEHHA to establish a PHG by January 1, 2003 and for DHS to adopt a primary drinking water standard by January 1, 2004 signed by the Governor on September 8, 2002..

In summary, it is premature to adopt a drinking water standard for perchlorate concentrations without considering the scientific evidence. Consequently, the current action level of 4 µg/L is used as a threshold for significance recognizing that the ultimate MCL could be higher than the action level.

SOURCE AND DISPOSITION OF PERCHLORATE

Perchlorate was initially detected by Metropolitan at a level of 9 µg/L at Lake Havasu (see **Figure 5-8** of the Draft PEIR and repeated below). Recent measurements at Lake Havasu have been in the range of 4 to 6 µg/L. In 2001 and 2002, IID detected perchlorate in the All-American Canal system ranging from 4.2 to 5.3 µg/L.

Figure 1
Perchlorate Concentrations in Colorado River Aqueduct Water



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